

CLAIM STATUS

1	Currently Amended	24	Currently Amended
2	Currently Amended	25	Currently Amended
3	Currently Amended	26	Currently Amended
4	Currently Amended	27	Currently Amended
5	Currently Amended	28	Cancelled
6	Currently Amended	29	Cancelled
7	Currently Amended	30	Cancelled
8	Currently Amended	31	Cancelled
9	Currently Amended	32	Cancelled
10	Currently Amended	33	Cancelled
11	Currently Amended	34	Cancelled
12	Currently Amended	35	Cancelled
13	Currently Amended	36	Cancelled
14	Currently Amended	37	Cancelled
15	Currently Amended	38	Cancelled
16	Currently Amended	39	Cancelled
17	Currently Amended	40	Cancelled
18	Currently Amended	41	Cancelled
19	Currently Amended	42	Cancelled
20	Currently Amended	43	Cancelled
21	Currently Amended	44	Cancelled
22	Currently Amended	45	Cancelled
23	Currently Amended	46	Currently Amended

47	Currently Amended	69	New
48	Cancelled	70	New
49	Cancelled	71	New
50	Cancelled	72	New
51	Cancelled	73	New
52	Cancelled	74	New
53	Cancelled	75	New
54	Cancelled	76	New
55	Cancelled	77	New
56	Cancelled	78	New
57	Cancelled	79	New
58	Cancelled	80	New
59	Cancelled	81	New
60	Cancelled	82	New
61	Cancelled	83	New
62	Cancelled	84	New
63	Cancelled	85	New
64	Cancelled	86	New
65	Cancelled	87	New
66	Cancelled	88	New
67	Cancelled		
68	New		

CLAIM AMENDMENTS

1 (Currently Amended)

An ~~automatic~~ A pool cover system for operating a buoyant cover and where the cover is controlled in ~~both opening and~~ at least closing movements of said cover relative to a swimming pool, said pool cover system comprising:

- B
- a) ~~a buoyant cover~~ ^{AND} a rotatable cover drum for winding ^{THE} ~~a~~ buoyant cover comprised of at least one buoyant panel onto said drum and allowing unwinding of the cover from the drum to a closed position so that the cover may extend across and cover the swimming pool, ^{ADAPTED TO} said cover moving across said swimming pool with at least the force of gravity or buoyancy operating on said cover;
- b) a ~~hydraulic~~ fluid motor for causing driving movement of the cover drum allowing the pool cover to move across a swimming pool to an open position ~~and~~ with winding of the cover onto the cover drum; and
- ~~e) movement control means operatively said cover drum to control a rate of movement of the cover the cover over a swimming pool; and~~
- ~~d~~ c) a travel limiting means for controlling the limits of movement of the cover and stopping

Block

movement of the cover through the action of a
fluid pressure differential which is generated
when the cover has reached a closed position
to preclude further movement of the cover at
the closed position, and electrical means
operable in response to said fluid pressure
differential to initiate an electrical
response and stop rotation of said drum when
the cover reaches the closed position.

2 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 1 further characterized that said ~~hydraulic~~ fluid motor is operated by an electrical power pack remote from the hydraulic motor and from the swimming pool and said electrical response occurs in association with said electrical power pack.

3 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 1 further characterized in that said cover drum is located in a position where it is submerged in water and buoyant forces act upon the cover wound upon said drum to cause an unwinding thereof such that a positive driving force to move the cover to the closed position would not necessarily be required, and said movement control means controls movement resulting from the tendency of the cover to unwind from said cover drum.

4 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 further characterized in that said ~~hydraulic~~ fluid motor provides a positive driving action for moving the cover to the opened position and when winding the pool cover about the drum, but ~~operates~~ operating in conjunction with a braking means in reverse to provide a braking action ~~to aid in preventing~~ when the cover is unwinding from the drum to thereby restrain tendency of the cover to unwind from the drum.

5 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 77 further characterized in that said movement control means for controlling movement is a one way brake device.

6 (Currently Amended)

The ~~automatic~~ pool cover system Claim 3 further characterized in that the travel limiting means ~~is~~ comprises a hard stop travel limiter.

7 (Currently Amended)

B/C
The ~~automatic~~ pool cover system of Claim ~~4~~ 77 further characterized in that said movement control means comprises an internal brake with said hydraulic motor.

8 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 further characterized in that said travel limiting means comprises a rotary encoder limit switch.

9 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 further characterized in that said travel limiting means comprises a ~~mechanical~~ mechanically actuated limit switch.

10 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 77 further characterized in that the ~~travel limiting~~ movement control means comprises a worm gear drive.

11 (Currently Amended)

B/C
The ~~automatic~~ pool cover system of Claim 3 further characterized in that ~~the travel limiting means~~ said fluid motor is a hydraulic motor, said pool cover system comprises a hydraulic pump, and said travel limiting means comprises a pressure sensitive device responsive to said pressure differential ~~with an adjustable pressure relief valve.~~

12 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 3 further characterized in that ~~travel limiting the means~~ said fluid motor is a hydraulic motor, said pool cover system comprises a hydraulic pump with, and said travel limiting means comprises an adjustable pressure transducer switch and a latching electrical arrangement for controlling electrical power to a means for driving the hydraulic motor.

~~An automatic~~ A pool cover system for operating a buoyant swimming pool cover comprised of at least one buoyant panel and for moving same across a swimming pool to a closed position where the cover extends over the swimming pool and back to an opened position ~~where the cover is wound upon a drum~~, said automatic pool cover system comprising:

- Ball
- a) a cover drum upon which a the buoyant swimming pool cover ~~comprised of at least one buoyant panel~~ which is wound thereon ~~for storage when the pool cover is wound upon the drum~~ to allow the swimming pool to be in an opened condition and which allows for unwinding from the drum to cover the swimming pool;
 - b) a ~~hydraulic~~ fluid drive motor operatively connected to said drum for rotating same and causing a winding of the pool cover onto the drum ~~in order to open~~ when opening the swimming pool;
 - c) an electrically operated power pack in a position remote from said pool cover and said ~~hydraulic~~ fluid drive motor to provide a fluid driving force for operating said ~~hydraulic~~ fluid drive motor; ~~and~~

- B1
GNY
- d) ~~hydraulic~~ fluid line means carrying ~~only~~
~~hydraulic~~ fluid supplied to the fluid drive
motor and connected between said power pack
and said ~~hydraulic~~ fluid drive motor ~~and with~~
~~no electrical current connected between the~~
~~power pack and the hydraulic motor or drum,~~
such that said ~~automatic~~ pool cover system can
operate ^{SAID COVER DRUM WHETHER IT IS} (a) ~~subaqueous~~ subaqueously located or
(an) elevated [cover drum] ~~and can be~~
~~hydraulically operated,~~ thereby electrically
insulating the power pack from the ~~hydraulic~~
fluid drive motor and thereby eliminating any
electrical hazard at or in proximity to the
swimming pool; and
- e) pressure responsive means operable in response
to pressure of fluid in the fluid line means
such that the system provides control over a
limit of movement of the cover.

14 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 13 further
characterized in that said fluid motor is a hydraulic motor and
said fluid lines carry hydraulic fluid, and said power pack

includes a hydraulic pump in ~~close~~ proximity to said electric motor for operation by said electric motor.

15 (Currently Amended)

BEA
The ~~automatic~~ pool cover system of Claim 13 further characterized in that said drum is mounted on a drum shaft powered for rotation by said ~~hydraulic~~ fluid drive motor in at least the wind-up direction to wind the pool cover onto the drum, and a brake means is operable with respect to said shaft when said pool cover is being unwound from said drum ~~to move~~ allowing the cover to move to the closed position.

16 (Currently Amended)

The ~~automatic~~ pool cover system of Claim ~~15~~ 13 further characterized in that a said pressure responsive means comprises travel limiting ~~device~~ means which is operatively connected to said drum shaft and provides control for the end of travel positions of the pool cover in both the opened and the closed positions to thereby preclude a ~~hard impact~~ an overwinding or unwinding of the cover ~~against any fixed object~~ at the closed or opened positions.

17 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 16 further characterized in that said travel limiting ~~device~~ means has a traveler rotatable shaft and a traveler shiftable on said shaft in response to and proportional to rotation of said drum, such that the traveler moves for a distance proportional to the distance of movement of the cover, ~~and brake means is operable to control the speed of rotation of the drum when the cover is unwound from the drum from the same traveler rotatable shaft forming part of said travel limiting device.~~

18 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 17 further characterized in that said drum is mounted for rotation on a drum shaft, and means couples the traveler shaft of said travel limiting device to the drum shaft, such that when a ~~movable element forming part of the travel limiting device~~ the traveler reaches an end position, it will ~~automatically~~ result in an action which causes the sending of a signal to an electrical circuit arrangement and which circuit arrangement will operate to stop movement of the drum shaft.

B/C
~~An automatic~~ A pool cover system ^{which} ~~(for)~~ ^{is} moving a swimming pool cover comprised of at least one ~~buoyant panel~~ buoyant panel to a closed position where the cover extends over a swimming pool and back from the closed position to an open position where the cover is wound upon a cover drum, said pool cover system comprising:

- a) a drum for winding the cover onto the drum when the cover is being moved to the fully opened position allowing access to the swimming pool;
- b) fluid operated motive means for causing rotation of the drum to wind the cover onto the drum; and
- ~~b) a travel limiting device for limiting rotation of the drum and stopping rotation of the drum at the closed position to thereby preclude an over-unwinding of the cover from the drum at a fixed end position thereat; and~~
- c) one-way brake means for providing a braking action which controls ~~controlling~~ the speed of movement of the cover from the fully opened position where the cover is wound upon the drum to the closed position when the cover is

moving across the swimming pool, and which brake means operates in a first mode to provide no braking action and no braking force is applied to the drum or to the pool cover when the motive means is rotating the cover drum to wind ~~in opposition to the action of the hydraulic motor when the latter is moving the cover to~~ on the drum bringing the cover to the fully opened position, said brake means providing also being operable in a second mode to provide a positive braking action to control and limit the rate of movement of the cover unwinding from the drum when the cover is moving to the closed position and which would otherwise move uncontrolled toward the closed position as a result of buoyant forces or the force of gravity acting upon the pool cover, ~~and also operating to control the rate of movement of the cover from the opened position to the fully closed position, such that any braking force is applied in one direction only and only when the cover is moving from the opened position to the closed position and no braking force is applied when~~

the cover is moving from the closed position
to the opened position.

20 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 19 further characterized in that said brake means is a one way holding brake.

21 (Currently Amended)

BCA
The ~~automatic~~ pool cover system of Claim 19 further characterized in that said brake means comprises a counter balance valve and return check valve which allows for controlled flow to close the pool cover and unrestricted flow when the pool cover is opening operating in a reverse direction.

22 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 19 further characterized in that said brake means comprises a drive ratio brake operating in conjunction with the travel limiting device.

23 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 19 further characterized in that said brake means is a hydraulic motor is connected to and rotates the cover drum, and said brake means comprises a brake internal in said motor and operates as a holding brake worm gear arrangement with a component operating in conjunction therewith to provide a braking action in one direction and which provides no braking force in an opposite direction.

24 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 19 further characterized in that the ~~travel limiting device~~ pool cover system comprises a rotary shaft travel limiter with a mechanically engageable traveling ~~nut~~ element.

25 (Currently Amended)

The ~~automatic~~ pool cover system of Claim 19 further characterized in that said motive means comprises a hydraulic motor which is coupled to said cover drum to rotate same, and the ~~travel limiting device of~~ the pool cover system comprises a rotary hard stop travel limiter with ~~hydraulic poppet~~ a pressure relief valve allowing for bypassing ~~diversion~~ of pressure flow from the hydraulic motor.

26 (Currently Amended)

BGA
The ~~automatic~~ pool cover system of Claim 19 further characterized in that said motive means comprises a hydraulic motor which is coupled to the cover drum for rotating same to wind the cover onto the drum, and ~~the travel limiting device~~ the pool cover system comprises an electrically operated power pack at a remote site for supplying hydraulic pressure to operate the hydraulic motor, and a pressure relief valve located at the remote power pack and operating in conjunction with the hydraulic motor to enable a bypassing of pressure to the hydraulic motor to provide for a braking action.

In an automatic ~~pool~~ cover system ~~moving~~ providing for winding
a ~~buoyant~~ cover ~~wound~~ upon a drum ~~between~~ from a fully opened end
closed position and to a fully closed end opened position and
allowing for unwinding of the cover from the drum for movement to a
fully closed position, an improvement comprising a travel limiting
device arrangement for controlling movement of the ~~pool~~ cover so
that it does not excessively unwind from the drum when the cover
reaches at least ~~at one end~~ the closed position, said travel
limiting ~~device~~ arrangement having a travel limiter element moving
a travel limiting distance between two travel limiting end
positions on the travel limiting ~~device~~ arrangement and ~~which where~~
movement of the travel limiter element for a travel limiting
distance is representative of a cover movement distance between end
positions of and proportional to the cover movement a distance of
movement of the cover between the opened and closed end positions
of the cover, said travel limiter element engaging with travel
limiting end ^{ELEMENTS} positions when the cover reaches its opened or closed
end positions of movement and, fluid control means associated with
the travel limiter end ^{ELEMENTS} positions and engageable by the travel
limiter element and operable to provide a fluid pressure condition
to control movement of the cover, thereby precluding any over-
winding or over-unwinding of the cover at either of the fully
opened position or fully closed position.

B/C

✓17

19

28-45 (Canceled)

B
C

This Page Blank (uspto)

B. 137
A method of operating a swimming pool cover comprised of at least one buoyant panel which is capable of extending to a closed position over a swimming pool and to an opened position where it is wound upon a cover drum ~~and where the rate of movement of the cover is controlled during such movement at least to the closed position,~~ said method comprising:

- a) providing a rotating power to said cover drum for rotating same at least in a wind-up direction to rotate the pool cover about the drum and which is powered for rotation only from a ~~hydraulic power~~ fluid driving source at or in proximity to said swimming pool;
- ~~b) providing a braking action to said drum when the cover is unwinding from the drum to a closed position across the swimming pool to thereby control the rate of movement of the cover during movement to the closed position, and~~
- e b) ~~controlling the limits of movement of the cover to the opened position and the closed position moving a traveler element of a travel limiting through assembly a member associated with~~ in proportion to the movement of the drum

~~moving said member a distance proportional to the limits of movement of the cover from the opened position to the closed position;~~

- B'G'D
- c) generating a fluid pressure condition when the traveler element reaches a first limit of travel at the closed position; and
- d) converting that pressure condition into an electrical action at a position remote to the swimming pool to stop rotating power to the cover drum, to thereby preclude an over-winding onto or an over unwinding of the cover from the drum at such end positions closed position.

47 (Currently Amended)

The method of Claim 46 further characterized in that said method comprises providing ~~hydraulic~~ fluid under pressure to a ~~hydraulic~~ fluid motor located at or in proximity to said drum and which causes rotation of said drum, said fluid motor being operated by the hydraulic fluid under pressure being provided from and which fluid is driven under pressure from an electrically operated power source at a remote location.

48 - 67 (Cancelled)

68 (New)

The pool cover system of Claim 1 further characterized in that said fluid pressure differential is generated in a fluid pressure line associated with supplying fluid under pressure to said fluid motor and activates a fluid pressure switch in response thereto.

69 (New)

The pool cover system of Claim 18 further characterized in that said travel limiting means comprises said fluid pressure switch.

70 (New)

The pool cover system of Claim 69 further characterized in that said travel limiting means comprises a traveler element moving in response to rotation of the drum between a pair of traveler end positions.

71 (New)

The pool cover system of Claim 13 further characterized in that said pool cover system comprises an electrical circuit arrangement operatively connected to the pressure responsive means and operable in response to the pressure differential for controlling rotation of said cover drum and thereby controlling movement of said cover to preclude over-unwinding of said cover.

72 (New)

The pool cover system of Claim 13 further characterized in that said drum is mounted on a drum shaft powered for rotation by said fluid drive motor in at least the wind-up direction to wind the pool cover onto the drum.

73 (New)

BCA
The pool cover system of Claim 13 further characterized in that said pressure responsive means is operatively connected to a travel limiting device associated with said drum and provides control for the end of travel positions of the pool cover in both the opened and the closed positions to thereby preclude an overwinding or over-unwinding of the cover from the drum at the closed or opened positions.

74 (New)

The pool cover system of Claim 73 further characterized in that said travel limiting device has a traveler rotatable shaft and said travel limiter element is shiftable on said shaft in response to and proportional to rotation of said drum, such that the travel limiter element moves for a distance proportional to the distance of movement of the cover.

75 (New)

The pool cover system of Claim 74 further characterized in that when the travel limiter element reaches an end position, it will result in an action which causes the sending of a signal to the electrical circuit arrangement and which circuit arrangement will operate to stop movement of the drum.

76 (New)

B. Card
The improvement in the (pool) cover system of Claim 27 further characterized in that the travel limiting arrangement also comprises an electrical circuit arrangement operatively connected to the fluid control means for controlling rotation of the cover and stopping movement of the cover at a closed end position.

77 (New)

The pool cover system of Claim 1 further characterized in that said pool cover system comprises movement control means operatively associated with said cover drum to control a rate of movement of the cover from the cover drum during extension of the cover over a swimming pool.

78 (New)

The pool cover system of Claim 19 further characterized in that said pool cover system comprises a travel limiting device for

limiting rotation of the drum in response to a fluid pressure condition when the cover is unwinding from the drum and reaches the closed position to thereby preclude an over-unwinding of the cover from the drum thereat.

6/25/82

A pool cover system for operating a buoyant cover and where the cover is controlled in at least closing movement relative to a swimming pool, said pool cover system comprising:

- B/C
- a) a rotatable cover drum for winding a buoyant cover onto said drum thereby moving said cover to an opened position and allowing unwinding of the cover from the drum for movement to a closed position so that the cover may extend across and cover the swimming pool;
 - b) a fluid drive motor for operating the cover drum and winding the cover onto the cover drum thereby causing movement of the pool cover across the swimming pool to an open position;
 - c) an electrically operated power assembly for causing operation of said fluid drive motor;
 - d) means for detecting the presence of the cover when the cover moves to or near the closed position and causing generation of a pressure condition in response thereto; and
 - e) an electrical power arrangement for causing generation of a responsive electrical action in response to the generated pressure condition and causing the responsive

electrical action to abate operation of the
fluid motor by the power assembly.

80 (New)

The pool cover system of Claim 79 further characterized in that said cover is controlled in both opening and closing movements to prevent over-winding or over-unwinding at the opened and closed positions.

81 (New)

Black
The pool cover system of Claim 79 further characterized in that the pressure condition is a change in fluid pressure generated in a fluid line connected to said fluid drive motor.

82 (New)

The pool cover system of Claim 81 further characterized in that the electrical arrangement is an electrical latching circuit and the response to the pressure condition is the generation of an electrical signal.

83 (New)

The pool cover system of Claim 79 further characterized in that said electrical power arrangement is associated with the

electrically operated power assembly and is remote from the fluid drive motor and from the swimming pool.

84 (New)

B/C
The pool cover system of Claim 79 further characterized in that said cover drum is located in a position where it is submerged in water and buoyant or gravitational forces act upon the cover when wound upon said drum to cause an unwinding thereof, and a brake means forms part of said system to control movement of the cover to the closed position resulting from the tendency of the cover to unwind from said cover drum as a result of buoyant forces.

85 (New)

The pool cover system of Claim 79 further characterized in that said cover drum is located in an elevated position where it is above the surface of the water in the swimming pool and gravitational forces tend to cause an unwinding of the cover from the drum to cause an unwinding thereof, and a brake means forms part of said system to control movement of the cover to the closed position resulting from the tendency of the cover to unwind from the drum as a result of gravitational forces.

The pool cover system of Claim 81 further comprising:

- B/C 22
- a) a travel limiting housing;
 - b) a travel limiter shaft arrangement extending through said housing;
 - c) a traveler element movable on said travel limiter shaft arrangement and translating movement therealong in response to relative rotation between said transfer shaft arrangement and said traveler element;
 - d) a first fixed contact element in said travel limiting device housing representing one end position of travel of the pool cover and which traveler element contacts the first fixed contact element when the cover reaches a first end position of travel across the swimming pool; and
 - e) a second fixed contact element in said housing representing an opposite end position of travel of the pool cover and which traveler element contacts the second fixed contact element substantially with the cover reaching a second end position of travel across the swimming pool.

87 (New)

The automatic pool cover system of Claim 86 further characterized in that said traveler element translates axially along said shaft through threaded engagement of said traveler element with said travel limiter shaft and which is keyed with respect to said housing to preclude rotation of said traveler element.

88 (New)

The travel limiting device of Claim 86 further characterized in that adjustment means is provided for adjusting the first and second end positions of the traveler element to coincide with the respective end positions of movement of the pool cover.
